

COMBINED DECLARATION FOR PATENT
APPLICATION AND POWER OF ATTORNEY
(Includes Reference to PCT International Applications)

ATTORNEY'S DOCKET NUMBER

57955/010

As a below named inventor, I hereby declare that:

My residence, post office address and citizenship are as stated below next to my name.

I believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled:

METHOD FOR MODIFYING PLANT MORPHOLOGY, BIOCHEMISTRY AND PHYSIOLOGY

the specification of which (check only one item below):

is attached hereto.

was filed as U.S. Patent Application Serial No. _____ on _____ and was amended on _____ (if applicable).

was filed as PCT International Application Number _____ on _____ and was amended under PCT Article 19 on _____ (if applicable).

I hereby state that I have reviewed and understand the contents of the above-identified specifications, including the claims, as amended by any amendment referred to above.

I acknowledge the duty to disclose information which is material to the patentability of this application in accordance with Title 37, Code of Federal Regulations, § 1.56(a).

I hereby claim priority benefits under Title 35, United States Code, § 119 of any application(s) for patent or inventor's certificate or any PCT international application(s) designating at least one country other than the United States listed below and have also identified below any application(s) for patent or inventor's certificate or any PCT international application(s) designating at least one country other than the United States of America filed by me on the same subject matter having a filing date before that of the application(s) of which priority is claimed:

PRIOR APPLICATION(S) AND ANY PRIORITY CLAIMS UNDER 35 U.S.C. 119:

COUNTRY (IF PCT, indicate "PCT")	APPLICATION NUMBER	DATE OF FILING (day, month, year)	PRIORITY CLAIMED UNDER 35 USC 119
EP	00870132.8	16/6/00	<input checked="" type="checkbox"/> YES <input type="checkbox"/> NO
			<input type="checkbox"/> YES <input type="checkbox"/> NO
			<input type="checkbox"/> YES <input type="checkbox"/> NO
			<input type="checkbox"/> YES <input type="checkbox"/> NO
			<input type="checkbox"/> YES <input type="checkbox"/> NO
			<input type="checkbox"/> YES <input type="checkbox"/> NO
			<input type="checkbox"/> YES <input type="checkbox"/> NO
			<input type="checkbox"/> YES <input type="checkbox"/> NO

COMBINED DECLARATION FOR PATENT
APPLICATION AND POWER OF ATTORNEY (Continued)
(Includes Reference to PCT International Applications)

ATTORNEY'S DOCKET NUMBER
57955/010

I hereby claim the benefit under Title 35, United States Code, § 120 of any United States application(s) or PCT international application(s) designating the United States of America that is/are listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in that/those prior application(s) in the manner provided by the first paragraph of Title 35, United States Code, § 112, I acknowledge the duty to disclose material information as defined in Title 37, Code of Federal Regulations, § 1.56(a) which occurred between the filing date of the prior application(s) and the national or PCT International filing date of this application:

**PRIOR U.S. APPLICATIONS OR PCT INTERNATIONAL APPLICATIONS DESIGNATING THE U.S. FOR BENEFIT
UNDER 35 U.S.C. 120:**

U.S. APPLICATIONS		STATUS (Check One)		
U.S. APPLICATION NUMBER	U.S. FILING DATE	PATENTED	PENDING	ABANDONED
PCT APPLICATIONS DESIGNATING THE U.S.				
PCT APPLICATION NO.	PCT FILING DATE	U.S. SERIAL NUMBERS ASSIGNED (if any)		
PCT/EP01/06833	June 18, 2001			

POWER OF ATTORNEY: As a named inventor, I hereby appoint the following attorney(s) and/or agent(s) to prosecute this application and transact all business in the Patent and Trademark Office connected therewith. Ann R. Pokalsky, Registration No. 34,697; Michael L. Goldman, Registration No. 30,727; Joseph M. Noto, Registration No. 32,163; Gunnar G. Leinberg, Registration No. 35,584; Edwin V. Merkel, Registration No. 40,087; Georgia Evans, Registration No. 44,597; Alice Y. Choi, Registration No. 45,758; Andrew K. Gonsalves, Registration No. 48,145; Noreen L. Connolly, Registration No. 48,987; John Campa, Registration No. 49,014

Send Correspondence to:	Ann R. Pokalsky, Esq. NIXON PEABODY LLP 990 Stewart Avenue Garden City, New York 11530-4838	Direct telephone calls to: (516) 832-7572
-------------------------	--	--

2 0 1	FULL NAME OF INVENTOR Schmulling	FAMILY NAME Thomas	FIRST GIVEN NAME Thomas	SECOND GIVEN NAME
2 0 1	RESIDENCE & CITIZENSHIP Tübingen	CITY Tübingen	STATE/FOREIGN COUNTRY Germany	COUNTRY OF CITIZENSHIP Germany
2 0 1	POST OFFICE ADDRESS Gertrud-Baümer-strasse 8	P.O. ADDRESS Gertrud-Baümer-strasse 8	CITY Tübingen	STATE & ZIP CODE/COUNTRY D-72074/Germany
2 0 2	FULL NAME OF INVENTOR Werner	FAMILY NAME Werner	FIRST GIVEN NAME Tomás	SECOND GIVEN NAME
2 0 2	RESIDENCE & CITIZENSHIP Tübingen	CITY Tübingen	STATE/FOREIGN COUNTRY Germany	COUNTRY OF CITIZENSHIP Germany
2 0 2	POST OFFICE ADDRESS Haldenstrasse 2	P.O. ADDRESS Haldenstrasse 2	CITY Tübingen	STATE & ZIP CODE/COUNTRY D-72074/Germany
2 0 3	FULL NAME OF INVENTOR	FAMILY NAME	FIRST GIVEN NAME	SECOND GIVEN NAME
2 0 3	RESIDENCE & CITIZENSHIP	CITY	STATE/FOREIGN COUNTRY	COUNTRY OF CITIZENSHIP
2 0 3	POST OFFICE ADDRESS	P.O. ADDRESS	CITY	STATE & ZIP CODE/COUNTRY

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under section 1001 of Title 18 of the United States Code, and that such willful false statements may jeopardize the validity of the application or any patent issuing thereon.

SIGNATURE OF INVENTOR 201 UNSIGNED	SIGNATURE OF INVENTOR 202 UNSIGNED	SIGNATURE OF INVENTOR 203
DATE: December 10, 2001	DATE: December 10, 2001	DATE

SEQUENCE LISTING

<110> Schmülling, Thomas
Werner, Tomás
5
<120> Method for modifying plant morphology, biochemistry and
physiology
10
<130> CROP-005-PCT
<140>
<141>
15
<150> EP 00870132.8
<151> 2000-06-16

<150> US 60/258,415
<151> 2000-12-27
20
<150> EP 01870053.4
<151> 2001-03-16

<160> 36
25
<170> PatentIn Ver. 2.1

<210> 1
<211> 2236
<212> DNA
30
<213> *Arabidopsis thaliana*

<400> 1
atgggattga cctcatcctt acggttccat agacaaaaca acaagacttt cctcggaatc
60
35 ttcatgatct tagttctaag ctgtataccca ggtagaacca atctttgttc caatcattct
120
gttagtaccc caaaagaatt accttcttca aatccttcag atattcggttc ctcatttagtt
180
tcactagatt tggagggtta tataagcttc gacgatgtcc acaatgtggc caaggacttt
240
40 ggcacacagat accagttacc acctttggca attctacatc caaggtcagt ttttgatatt
300
tcatcgatga tgaagcatat agtacatctg ggctccaccc caaatcttac agtagcagct
360
45 agaggccatg gtcactcgct tcaaggacaa gctctagctc atcaagggtgt tgcataaaa
420
atggagtac ttcgaagtcc tgatatcagg atttataagg ggaagcaacc atatgttgat
480
50 gcttcaggtg gtgaaatatg gataaacatt ctacgcgaga ctctaaaata cggctttca
540
ccaaagtccct ggacagacta ccttcatttg accgttggag gtacactatc taatgctgga
600
atcagcggtc aagcattcaa gcatggaccc caaatcaaca acgtctacca gctagagatt
660
55 gttacaggtt tttcattcat gctttatctc tgccgttagtc tcaaaaaaat atgcacctgt
720
aaagaatatac catctcttca tgagcaaaaa cactgacgac tttaaataat ttttgactat
780
aaaacaagag tgcataaggca caaatgtgaa atatgcaaca cacaattgta acttgcacca
840

agaaaaaaagt tataaaaaca aacaactgat aagcaatata tttccaatat ttaatcaggg
900
aaaggagaag tcgtaacctg ttctgagaag cggaattctg aacttttctt cagtgttctt
960
5 ggcgggcttg gacagtttg cataatcacc cgggcacgga tctctcttga accagcaccg
1020
catatggtaa agttctatct tgaacaaagt tcaaacaata tacgctatga ttctaagaac
1080
10 cactttcctg acacagtcaa ataacttta ataggtaaa tggatcaggg tactctactc
1140
tgactttct gcatttcaa gggaccaaga atatctgatt tcgaaggaga aaactttga
1200
ttacgttgaa ggatttgtga taatcaatag aacagacctt ctcataatt ggcgatcgtc
1260
15 attcagtcgg aacgattcca cacaggcaag cagattcaag tcagatggga aaactcttta
1320
ttgcctagaa gtggtcaaatttcaaccc agaagaagct agctctatgg atcaggtaag
1380
atgtgaaagc aatatataac tagacttagt ttccacagag agctccaaat caaccgttgg
1440
20 ctactagcct actaacataa tgaatggttg ccgtgcagga aactggcaag ttacttcag
1500
agttaaatatttccatcc actttgtttt catctgaagt gccatataatc gagttctgg
1560
25 atcgcgtgca tatcgcagag agaaaactaa gagcaaaggg tttatggag gttccacatc
1620
cctggctgaa tctcctgatt cctaagagca gcatatacca atttgctaca gaagtttca
1680
30 acaacattct cacaagcaac aacaacggtc ctatccttat ttatccagtc aatcaatcca
1740
agtaagtgag caaaatgcca aaagcaaatg cgtccagtga ttctgaaaca taaattacta
1800
accatatcca acattttgtg gttcaggtg gaagaaaacat acatcttga taactccaaa
1860
35 tgaagatata ttctatctcg tagcctttct cccctctgca gtgccaaatt cctcaggaa
1920
aaacgatcta gagtacctt taaaacaaaa ccaaagagtt atgaacttct ggcgcagc
1980
40 aaacctcaac gtgaagcagt atttgccca ttatgaaact caaaaagagt gggaaatcaca
2040
cttggcaaa agatggaaa cattgcaca gagaaaacaa gcctacgacc ctctagcgat
2100
tctagcacct ggcggaaatggaa tattccaaaa gacaacagga aaattatctc ccatccaact
2160
45 cggaaagtca aaggcaacag gaagtcctca aaggtaccat tacgcatcaa tactgccgaa
2220
acctagaact gtataa
2236
50
<210> 2
<211> 575
<212> PRT
<213> *Arabidopsis thaliana*
55
<400> 2
Met Gly Leu Thr Ser Ser Leu Arg Phe His Arg Gln Asn Asn Lys Thr
1 5 10 15
60 Phe Leu Gly Ile Phe Met Ile Leu Val Leu Ser Cys Ile Pro Gly Arg

20 25 30

5 Thr Asn Leu Cys Ser Asn His Ser Val Ser Thr Pro Lys Glu Leu Pro
35 40 45

5 Ser Ser Asn Pro Ser Asp Ile Arg Ser Ser Leu Val Ser Leu Asp Leu
50 55 60

10 Glu Gly Tyr Ile Ser Phe Asp Asp Val His Asn Val Ala Lys Asp Phe
65 70 75 80

Gly Asn Arg Tyr Gln Leu Pro Pro Leu Ala Ile Leu His Pro Arg Ser
85 90 95

15 Val Phe Asp Ile Ser Ser Met Met Lys His Ile Val His Leu Gly Ser
100 105 110

Thr Ser Asn Leu Thr Val Ala Ala Arg Gly His Gly His Ser Leu Gln
115 120 125

20 Gly Gln Ala Leu Ala His Gln Gly Val Val Ile Lys Met Glu Ser Leu
130 135 140

25 Arg Ser Pro Asp Ile Arg Ile Tyr Lys Gly Lys Gln Pro Tyr Val Asp
145 150 155 160

Val Ser Gly Gly Glu Ile Trp Ile Asn Ile Leu Arg Glu Thr Leu Lys
165 170 175

30 Tyr Gly Leu Ser Pro Lys Ser Trp Thr Asp Tyr Leu His Leu Thr Val
180 185 190

Gly Gly Thr Leu Ser Asn Ala Gly Ile Ser Gly Gln Ala Phe Lys His
195 200 205

35 Gly Pro Gln Ile Asn Asn Val Tyr Gln Leu Glu Ile Val Thr Gly Lys
210 215 220

40 Gly Glu Val Val Thr Cys Ser Glu Lys Arg Asn Ser Glu Leu Phe Phe
225 230 235 240

Ser Val Leu Gly Gly Leu Gly Gln Phe Gly Ile Ile Thr Arg Ala Arg
245 250 255

45 Ile Ser Leu Glu Pro Ala Pro His Met Val Lys Trp Ile Arg Val Leu
260 265 270

Tyr Ser Asp Phe Ser Ala Phe Ser Arg Asp Gln Glu Tyr Leu Ile Ser
275 280 285

50 Lys Glu Lys Thr Phe Asp Tyr Val Glu Gly Phe Val Ile Ile Asn Arg
290 295 300

55 Thr Asp Leu Leu Asn Asn Trp Arg Ser Ser Phe Ser Pro Asn Asp Ser
305 310 315 320

Thr Gln Ala Ser Arg Phe Lys Ser Asp Gly Lys Thr Leu Tyr Cys Leu
325 330 335

60 Glu Val Val Lys Tyr Phe Asn Pro Glu Glu Ala Ser Ser Met Asp Gln

340 345 350

5 Glu Thr Gly Lys Leu Leu Ser Glu Leu Asn Tyr Ile Pro Ser Thr Leu
355 360 365

10 Phe Ser Ser Glu Val Pro Tyr Ile Glu Phe Leu Asp Arg Val His Ile
370 375 380

15 Ala Glu Arg Lys Leu Arg Ala Lys Gly Leu Trp Glu Val Pro His Pro
385 390 395 400

20 Trp Leu Asn Leu Leu Ile Pro Lys Ser Ser Ile Tyr Gln Phe Ala Thr
405 410 415

25 Glu Val Phe Asn Asn Ile Leu Thr Ser Asn Asn Asn Gly Pro Ile Leu
420 425 430

30 Ile Tyr Pro Val Asn Gln Ser Lys Trp Lys Lys His Thr Ser Leu Ile
435 440 445

35 Thr Pro Asn Glu Asp Ile Phe Tyr Leu Val Ala Phe Leu Pro Ser Ala
450 455 460

40 Val Pro Asn Ser Ser Gly Lys Asn Asp Leu Glu Tyr Leu Leu Lys Gln
465 470 475 480

45 Asn Gln Arg Val Met Asn Phe Cys Ala Ala Ala Asn Leu Asn Val Lys
485 490 495

50 Gln Tyr Leu Pro His Tyr Glu Thr Gln Lys Glu Trp Lys Ser His Phe
500 505 510

55 Gly Lys Arg Trp Glu Thr Phe Ala Gln Arg Lys Gln Ala Tyr Asp Pro
515 520 525

60 Leu Ala Ile Leu Ala Pro Gly Gln Arg Ile Phe Gln Lys Thr Thr Gly
530 535 540

65 Lys Leu Ser Pro Ile Gln Leu Ala Lys Ser Lys Ala Thr Gly Ser Pro
545 550 555 560

70 Gln Arg Tyr His Tyr Ala Ser Ile Leu Pro Lys Pro Arg Thr Val
565 570 575

75 <210> 3
<211> 2991
<212> DNA

80 50 <213> *Arabidopsis thaliana*

85 <400> 3
atggctaatt ttcgtttaat gatcacttta atcacggttt taatgatcac caaatcatca
90 60
95 55 aacggattta aaattgattt acctaaatcc cttaacctca ccctctctac cgatccttcc
100 120
105 180 atccatctccg cagcctctca tgacttcgga aacataacca ccgtgacccc cggcggcgta
110 180
115 60 atctgccccct cctccaccgc tgatatctct cgtctcctcc aatacggccgc aaacggaaaa
120 240

agtacattcc aagttagcggc tcgtggccaa ggccactcct taaacggcca agcctcggtc
300
tcggcgagg taatcgtaa catgacgtgt atcactgacg tggtggttc aaaagacaag
360
5 aagtacgctg acgtggcggc cgggacgtta tgggtggatg tgcttaagaa gacggcggag
420
aaaggggtgt cgccggtttc ttggacggat tatttcata taaccgtcgg aggaacgttg
480
10 tgaatggtg gaattggtgg tcaagtgttt cgaaacggtc ctctgttag taacgtcctt
540
gaattggacg ttattactgg tacgcattt ctaaactttg atgtacatac aacaacaaaa
600
actgtttttg tttttagta ttttcattt tttgtaccat aggtttatg tttttagtt
660
15 gtgctaaact tcttgcacca cacgtaagtc ttgcacacaaaatgcgtt acgcattat
720
atgtttttg tacatattga atgttggta tgagaaataa agtaattaca tatacacaca
780
20 ttattgtcg tacatataata aataattaaa gacaaatttt cacaatttgtt agcgtgtt
840
tttggattt ttgtaatgta catgcatttgc gcatgcatttggatcttttgcggatctt
900
gatttgtgtt gatattcaaa tatacattt attttcttttgcataaaagag gtggatatt
960
25 tttaaaatag caacattca gaatttttgcatttgcatttgcatttgcatttgcatttgcattt
1020
taatatggat tttgaataaa taatttcagg gaaaggtgaa atgttgacat gctcgac
1080
30 gctaaaccca gaattgttgcatttgcatttgcatttgcatttgcatttgcatttgcattt
1140
gagagccaga attgttttgg accatgcacc taaacgggttgcatttgcatttgcatttgcattt
1200
tttggatatt
1260
35 agtcaataga aaatgatttgcatttgcatttgcatttgcatttgcatttgcatttgcattt
1320
aaataaaata taacctaacg gaaataatta ttttactaat cggataatgt ctgattaaaa
1380
40 cattttatga tattacacta agagagtttgcatttgcatttgcatttgcatttgcattt
1440
cttagatggt atcctaaaac taaagtttgcatttgcatttgcatttgcatttgcatttgcattt
1500
agttgcatttgcatttgcatttgcatttgcatttgcatttgcatttgcatttgcatttgcattt
1560
45 taaagtttgcatttgcatttgcatttgcatttgcatttgcatttgcatttgcatttgcattt
1620
ctttttgtatgcatttgcatttgcatttgcatttgcatttgcatttgcatttgcatttgcattt
1680
50 actcaaataat actccaaagt tttagaatataat gtttttttttttttttttttttttttt
1740
ataaaacgttcaattt
1800
gttctgtttt agtttcatctt attcacaat tttatataat ttttttttttttttttttt
1860
55 aataactatac ttt
1920
tctctaaatgttcaatgg ttt
1980
60 ttacaaagg accaagaacg ttttttttttttttttttttttttttttttttttttttt
2040

gaaggtcaaa tatttctatc aaacgggtgc gttgacacac ttttttccc accttcagat
2100
caatctaaag tcgctgatct agtcaagcaa cacggtatca tctatgttct tgaagtagcc
2160
5 aagtattatg atgatccaa tctcccatc atcagcaagg tactacacat ttacatttc
2220
atcatcgttt ttatcatacc ataagatatt taaatgattc atcattgcac cacattaaga
2280
10 tattcatcat catcatcggtt acatttttt ttgcacatcta tgcttctcat aatctactat
2340
tgtgttaggtt attgacacat taacgaaaac attaagttac ttgcccgggt tcataatcaat
2400
gcacgacgtg gcctacttcg atttcttcaa ccgtgtacat gtcgaagaaa ataaactcag
2460
15 atctttggga ttatggaaac ttccatcc ttggcttaac ctctacgttc ctaaatctcg
2520
gattctcgat tttcataacg gtgttgtcaa agacattctt cttaaagcaa aatcagcttc
2580
20 gggactcgct cttctatc caacaaacccg gaataagtac atacttctct tcattcatat
2640
ttatcttcaa gaaccaaagt aaataaaattt ctatgaactg attatgctgt tattgttaga
2700
25 tgggacaatc gtagtcggc gatgatacca gagatcgatg aagatgttat atatattatc
2760
ggactactac aatccgctac cccaaaggat cttccagaag tggagagcgt taacgagaag
2820
ataaatttaggt tttgcaagga ttcaaggattt aagattaagc aatatctaattt gcattataact
2880
30 agtaaagaag attggattga gcattttggaa tcaaaatggg atgatttttc gaagaggaaa
2940
gatctatting atcccaagaa actgttatct ccagggcaag acatcttttg a
2991

35 <210> 4
<211> 501
<212> PRT
<213> *Arabidopsis thaliana*

40 <400> 4
Met Ala Asn Leu Arg Leu Met Ile Thr Leu Ile Thr Val Leu Met Ile
1 5 10 15

45 Thr Lys Ser Ser Asn Gly Ile Lys Ile Asp Leu Pro Lys Ser Leu Asn
20 25 30

Leu Thr Leu Ser Thr Asp Pro Ser Ile Ile Ser Ala Ala Ser His Asp
35 40 45

50 Phe Gly Asn Ile Thr Thr Val Thr Pro Gly Gly Val Ile Cys Pro Ser
50 55 60

Ser Thr Ala Asp Ile Ser Arg Leu Leu Gln Tyr Ala Ala Asn Gly Lys
65 70 75 80

55 Ser Thr Phe Gln Val Ala Ala Arg Gly Gln Gly His Ser Leu Asn Gly
85 90 95

60 Gln Ala Ser Val Ser Gly Gly Val Ile Val Asn Met Thr Cys Ile Thr
100 105 110

Asp Val Val Val Ser Lys Asp Lys Lys Tyr Ala Asp Val Ala Ala Gly
115 120 125

5 Thr Leu Trp Val Asp Val Leu Lys Lys Thr Ala Glu Lys Gly Val Ser
130 135 140

Pro Val Ser Trp Thr Asp Tyr Leu His Ile Thr Val Gly Gly Thr Leu
145 150 155 160

10 Ser Asn Gly Gly Ile Gly Gly Gln Val Phe Arg Asn Gly Pro Leu Val
165 170 175

Ser Asn Val Leu Glu Leu Asp Val Ile Thr Gly Lys Gly Glu Met Leu
180 185 190

15 Thr Cys Ser Arg Gln Leu Asn Pro Glu Leu Phe Tyr Gly Val Leu Gly
195 200 205

20 Gly Leu Gly Gln Phe Gly Ile Ile Thr Arg Ala Arg Ile Val Leu Asp
210 215 220

His Ala Pro Lys Arg Ala Lys Trp Phe Arg Met Leu Tyr Ser Asp Phe
225 230 235 240

25 Thr Thr Phe Thr Lys Asp Gln Glu Arg Leu Ile Ser Met Ala Asn Asp
245 250 255

Ile Gly Val Asp Tyr Leu Glu Gly Gln Ile Phe Leu Ser Asn Gly Val
30 260 265 270

Val Asp Thr Ser Phe Phe Pro Pro Ser Asp Gln Ser Lys Val Ala Asp
275 280 285

35 Leu Val Lys Gln His Gly Ile Ile Tyr Val Leu Glu Val Ala Lys Tyr
290 295 300

Tyr Asp Asp Pro Asn Leu Pro Ile Ile Ser Lys Val Ile Asp Thr Leu
305 310 315 320

40 Thr Lys Thr Leu Ser Tyr Leu Pro Gly Phe Ile Ser Met His Asp Val
325 330 335

Ala Tyr Phe Asp Phe Leu Asn Arg Val His Val Glu Glu Asn Lys Leu
45 340 345 350

Arg Ser Leu Gly Leu Trp Glu Leu Pro His Pro Trp Leu Asn Leu Tyr
355 360 365

50 Val Pro Lys Ser Arg Ile Leu Asp Phe His Asn Gly Val Val Lys Asp
370 375 380

Ile Leu Leu Lys Gln Lys Ser Ala Ser Gly Leu Ala Leu Leu Tyr Pro
385 390 395 400

55 Thr Asn Arg Asn Lys Trp Asp Asn Arg Met Ser Ala Met Ile Pro Glu
405 410 415

Ile Asp Glu Asp Val Ile Tyr Ile Ile Gly Leu Leu Gln Ser Ala Thr
60 420 425 430

Pro Lys Asp Leu Pro Glu Val Glu Ser Val Asn Glu Lys Ile Ile Arg
435 440 445

5 Phe Cys Lys Asp Ser Gly Ile Lys Ile Lys Gln Tyr Leu Met His Tyr
450 455 460

10 Thr Ser Lys Glu Asp Trp Ile Glu His Phe Gly Ser Lys Trp Asp Asp
465 470 475 480

15 Phe Ser Lys Arg Lys Asp Leu Phe Asp Pro Lys Lys Leu Leu Ser Pro
485 490 495

20 Gly Gln Asp Ile Phe
500

25 <210> 5
<211> 3302
<212> DNA
<213> *Arabidopsis thaliana*

30 <400> 5
atggcgagtt ataatcttcg ttcacaagg ttgtttatag caataacaat agtaatcatc
60
attactctct caactccgat cacaaccaac acatcaccac aaccatggaa tatcctttca
120
cacaacgaat tcgccccaaa actcacctcc tcctcctcct ccgtcgaaatc agccgcccaca
180
gatttcggcc acgtcaccaa aatcttcctc tccggcgatc taatcccttc ctccgttcaa
240
gacatcacag atctcataaaa actctctttt gactctcaac tgtctttcc ttttagccgt
300
35 cgtggtcacg gacacagcca ccgtggccaa gcctcggtta aagacggagt tgtggtaaac
360
atgcggtcca tggtaaaccg ggatcgaggt atcaagggtt ctaggacgtt tttatatgtt
420
40 gacgtggacg ctgcgtggct atggatttag gtgttgaata aaactttgaa gttagggtta
480
acgccggttt cttggacgga ttatgttat ttaacagtcg gtggacgtt atcaaacggc
540
50 ggaatttagtg gacaaacgtt tcggtacggt ccacagatca ctaatgttct agagatggat
600
45 gttattactg gtacgtacca cgatctttt cacacagaga ttaaaaaaaaaa cagtaatagt
660
gatttttaact tcgtacgttt ctgatagaca acaaagaact tcgtacgttt ttcaagttt
720
tttcgtcttt ttcatttttag atctgcgcgg ccattttgg ttatgttatt gtttgggtt
780
attgtttgtc tctgtttatt tatttctcga acttggatgtt agcttttctt ctttcacac
840
55 atcaatctaa tcacccctttt tggtcttaag attagaaaga agatacggac tagttaaaaa
900
taggtggttt taaacgtaga cgcattaaaa aaatattggt ttttttattt tttgataagc
960
aaaattggtg gttggtctaa gattataaac ttgatattaa tgcaaaggc gatctagcaa
1020
60 tagaaagatta atcaatattc ttgggtttt aacaacagat tatttcatca taaaatcgt
1080

gaaacaaaga aattttggta gtatacatta cgtgtagtt tgtagttt taaaaaaaaa
1140
tagtatatag ttttggtaaa acgcgattta ttttagtaaca cattagtata ttacacgttt
1200
5 aaccaactaa actttttttt ttgaataatt atgttctata tttcttactc aaattatgca
1260
aatttcgtgg attcgaagtc aaatttctgc gaaatttaca tggtcatata ttataaaaact
1320
10 gttcatataa cccggtaac aaacagacaa ttaagggttt gaatggttac ggcgggtggg
1380
gcggacacaa ccgtcaatag atcagaccgt ttttattta ccattcatca attatattcc
1440
gcagtggttt gggtaaaaaa aaatagaaga aaaccgcagc ggaccaattc cataccgttt
1500
15 ttacatacaa ataaacatgg tgcgcaacgg tttattgtcc gcctaaaaa tgaaatggac
1560
taaacccgcaag ataaattaga ccgctttgtc cgctgcctcc attcatagac taaaaaaaaa
1620
20 caacccaaaaa aaaaatggtc ccacgcccatt gattttacac gaggtttctt gtggcgtaag
1680
gacaaaaactc aaaagttcat aacgtttggt cctaaccagg tgaatggat taagtaacag
1740
tcaattttct tattatagct gtatccatta tgtccacata tgcattccata tacattacac
1800
25 tgggggtctc aagtgtagtt agattacgaa gactttcaag ttccattttt tggttaggag
1860
ataaaacataa tttaatgata ccgacttttag cactctaggc tcaaaacaag tacagaagag
1920
30 aatagtttta ttcaaaactc gttgcattgt tgaatcaatt aattgtgtta gtctttgtat
1980
attcttacat aacggtccaa gtttggtaa atagttact tactaaactt ttccataatgg
2040
ggtcaaattt tattttatag gaaaaggaga gattgcaact tggccaagg acatgaactc
2100
35 ggatcttttc ttgcgggtgt taggaggtt gggtaattc ggcattataa caagagccag
2160
aattaaactt gaagtagctc cgaaaagggt atgttaattt tgaatattat gcaactacag
2220
40 aaaattctat gaaattttatg aatgaacata tatgcatttt tggattttt taggccaagt
2280
ggtaaggtt tctatacata gatttctccg aattcacaag agatcaagaa cgagtgatat
2340
cgaaaacgga cggtagat ttcttagaa gttccattat ggtggaccat ggccaccgg
2400
45 ataactggag atccacgtat tatccaccgt ccgatcactt gaggatcgcc tcaatggtca
2460
aacgacatcg tgcatactac tgccttgaag tcgtcaagta ttacgacgaa acttctcaat
2520
50 acacagtcaa cgaggtccgt acatacatac aatcataatatacatacatgtat aattgggag
2580
atctttatgc attattcaat tatattaatt tacttttagtt attaactta tgcagggaaat
2640
2600 ggaggaggta agcgatagtt taaaccatgt aagagggttt atgtacgaga aagatgtgac
2700
55 gtatatggat ttccctaaacc gagttcgaac cggagagcta aacctgaaat ccaaaggcca
2760
atgggatgtt ccacatccat ggcttaatct cttcgatcca aaaactcaa tctccaaatt
2820
60 tcatatggat gtttttaagg gtattatcct aagaaataac atcactagcg gtcctgttct
2880

tgtttatcct atgaatcgca acaagtaagt ttaactcgat attgcaaaat ttactatcta
2940
cattttcggtt ttggaatccg aaatattctt acaagctaat tttatgcggc gtttttaggt
3000
5 ggaatgatcg gatgtctgcc gctatacccg aggaagatgt attttatgcg gtagggttt
3060
taagatccgc gggtttgac aattgggagg ctttgatca agaaaacatg gaaatactga
3120
10 agtttgtga gcatgctaat atgggggtta tacaatatct tccttatcat tcatacacaag
3180
aaggatgggt tagacatttt ggtccgaggt ggaatatttt ctagagaga aaatataat
3240
atgatcccaa aatgatatta tcaccgggac aaaatatatt tcaaaaaata aactcgagtt
3300
15 ag
3302

20 <210> 6
<211> 523
<212> PRT
<213> *Arabidopsis thaliana*

25 <400> 6
Met Ala Ser Tyr Asn Leu Arg Ser Gln Val Arg Leu Ile Ala Ile Thr
1 5 10 15

Ile Val Ile Ile Ile Thr Leu Ser Thr Pro Ile Thr Thr Asn Thr Ser
20 25 30

30 Pro Gln Pro Trp Asn Ile Leu Ser His Asn Glu Phe Ala Gly Lys Leu
35 40 45

35 Thr Ser Ser Ser Ser Val Glu Ser Ala Ala Thr Asp Phe Gly His
50 55 60

Val Thr Lys Ile Phe Pro Ser Ala Val Leu Ile Pro Ser Ser Val Glu
65 70 75 80

40 Asp Ile Thr Asp Leu Ile Lys Leu Ser Phe Asp Ser Gln Leu Ser Phe
85 90 95

Pro Leu Ala Ala Arg Gly His Ser His Arg Gly Gln Ala Ser
100 105 110

45 Ala Lys Asp Gly Val Val Val Asn Met Arg Ser Met Val Asn Arg Asp
115 120 125

50 Arg Gly Ile Lys Val Ser Arg Thr Cys Leu Tyr Val Asp Val Asp Ala
130 135 140

Ala Trp Leu Trp Ile Glu Val Leu Asn Lys Thr Leu Glu Leu Gly Leu
145 150 155 160

55 Thr Pro Val Ser Trp Thr Asp Tyr Leu Tyr Leu Thr Val Gly Gly Thr
165 170 175

Leu Ser Asn Gly Gly Ile Ser Gly Gln Thr Phe Arg Tyr Gly Pro Gln
180 185 190

60

Ile Thr Asn Val Leu Glu Met Asp Val Ile Thr Gly Lys Gly Glu Ile
195 200 205

5 Ala Thr Cys Ser Lys Asp Met Asn Ser Asp Leu Phe Phe Ala Val Leu
210 215 220

Gly Gly Leu Gly Gln Phe Gly Ile Ile Thr Arg Ala Arg Ile Lys Leu
225 230 235 240

10 Glu Val Ala Pro Lys Arg Ala Lys Trp Leu Arg Phe Leu Tyr Ile Asp
245 250 255

Phe Ser Glu Phe Thr Arg Asp Gln Glu Arg Val Ile Ser Lys Thr Asp
260 265 270

15 Gly Val Asp Phe Leu Glu Gly Ser Ile Met Val Asp His Gly Pro Pro
275 280 285

20 Asp Asn Trp Arg Ser Thr Tyr Tyr Pro Pro Ser Asp His Leu Arg Ile
290 295 300

Ala Ser Met Val Lys Arg His Arg Val Ile Tyr Cys Leu Glu Val Val
305 310 315 320

25 Lys Tyr Tyr Asp Glu Thr Ser Gln Tyr Thr Val Asn Glu Glu Met Glu
325 330 335

Glu Leu Ser Asp Ser Leu Asn His Val Arg Gly Phe Met Tyr Glu Lys
340 345 350

30 Asp Val Thr Tyr Met Asp Phe Leu Asn Arg Val Arg Thr Gly Glu Leu
355 360 365

Asn Leu Lys Ser Lys Gly Gln Trp Asp Val Pro His Pro Trp Leu Asn
35 370 375 380

Leu Phe Val Pro Lys Thr Gln Ile Ser Lys Phe Asp Asp Gly Val Phe
385 390 395 400

40 Lys Gly Ile Ile Leu Arg Asn Asn Ile Thr Ser Gly Pro Val Leu Val
405 410 415

Tyr Pro Met Asn Arg Asn Lys Trp Asn Asp Arg Met Ser Ala Ala Ile
420 425 430

45 Pro Glu Glu Asp Val Phe Tyr Ala Val Gly Phe Leu Arg Ser Ala Gly
435 440 445

50 Phe Asp Asn Trp Glu Ala Phe Asp Gln Glu Asn Met Glu Ile Leu Lys
450 455 460

Phe Cys Glu Asp Ala Asn Met Gly Val Ile Gln Tyr Leu Pro Tyr His
465 470 475 480

55 Ser Ser Gln Glu Gly Trp Val Arg His Phe Gly Pro Arg Trp Asn Ile
485 490 495

Phe Val Glu Arg Lys Tyr Lys Tyr Asp Pro Lys Met Ile Leu Ser Pro
500 505 510

Gly Gln Asn Ile Phe Gln Lys Ile Asn Ser Ser
515 520

5
<210> 7
<211> 2782
<212> DNA
<213> *Arabidopsis thaliana*

10
<400> 7
atgactaata ctctctgttt aagcctcatc accctaataa cgcttttat aagttaacc
60
ccaaccttaaa tcaaattcaga tgagggcatt gatgtttct tacccatatac actcaacctt
15
120
acggtcctaa ccgatccctt ctccatctct gccgcttctc acgacttcgg taacataacc
180
gacgaaaatc ccggcgccgt cctctgcctt tcctccacca cggaggtggc tcgtctcctc
240
20
cgttgcgtta acggaggatt ctcttacaat aaaggctcaa ccagccccgc gtctactttc
300
aaagtggctg ctcgaggcca aggccactcc ctccgtggcc agcctctgc acccggaggt
360
25
420
gtcgtcgtga acatgacgtg tctcgccatg gcggctaaac cagcggcggt tgttatctcg
gcagacggga cttacgctga cgtggctgcc gggacgatgt gggtggatgt tctgaaggcg
480
540
gccccggata gaggcgtctc gccggttaca tggacggatt atttgtatct cagcgtcggc
30
500
gggacgttgt cgaacgctgg aatcggtggt cagacgttta gacacggccc tcagattag
600
aacgttcatg agcttgcgt tattaccggt acgtaaatac caaaacttca ctaatctcg
660
tacaattttt taatttttg gtaatataaa ttttgtacgg ctcaactctt aattaagaat
720
35
780
gaaacagtat ctatgatctt ctatgtctc ttttttgc tgcaagcttt aattgttagta
acatcagcga tatatatatac acatgcgtgt gtattattga tgataatata taatgtttt
840
40
800
gttacaaatt tgattctaa ggtaaaactc acacgccata accagtataa aactccaaaa
atcacgtttt ggtcagaaat acatatcctt cattaaacagt agttatgcta taatttgc
960
50
1020
ttataaataa ctccggagtt tgttcacaat actaaatttc aggaaaaggt gaaatgtga
1140
cttgctctcc aaagttaaac cctgaattgt tctatggagt tttaggaggt ttgggtcaat
1080
55
1200
tcggtattat aacgagggcc aggattgcgt tggatcatgc acccacaagg gtatgtatca
1260
tgcatactata gtgtaatcaa ttataattt taatgttagt gtcctaaatc caaaatttga
1320
tttgatttgg ttggaacgta cgtatatata ataagtcaa aggctgatt tgaagacgaa
1380
tttatataact ttgttgaat taaatctgat ttgcttacg ttttattaga ttctgcgtaa
1440
taaatcctag gacttgctcg agtgtaatct tgtcttatgc ttgcaaatct tggtatgtc
aatatctaat ctttttattt atattccct acgtaaatgtt tagatataatg tattttaaac

tgctataaat tgtgtacgta tagactttag ataaaaaagtt gtggtcgctt gcacctat 1500
1500
gtttatcgct atagtgattc aaaggcttat atatgattct tggttttct ttttga 1560
1560
5 aatagaccat acaatccaag gaagatgatc ttaaatggac taatttatgg atataaattg 1620
1620
atatacaa 1680
atatacaa atctgcaggtga aatggtctcg catactctac agtgcattct cggctttaa 1680
1680
10 aagagaccaa gagcgtttaa tatcaatgac caatgatctc ggagttgact ttttggagg 1740
1740
tcaacttagt atgtcaa 1800
1800
tcaacttagt atgtcaa 1800
1800
aagagtcgca tctcttgc 1860
1860
15 ttatgacaga accacccttc 1920
1920
ttatcttac acaatcagta 1980
1980
aagtaatata 2040
2040
atcacatgat ataaataat 2040
2040
gaatcat 2100
2100
acgcttatta aataatcatt 2160
2160
25 ttcgctcca gggtttatgt 2220
2220
ccgaaacgaa gaagataaac 2280
2280
taacatctt 2340
2340
tcttctaaac caaacctcaa 2400
2400
gtaaatattt 2460
2460
30 atgttaaca agaatttattt 2520
2520
ggacgaagat 2580
2580
gcaagaactt 2640
2640
40 gattaaggaa 2700
2700
aaaatggat 2760
2760
45 agacaagac 2782
2782

50 <210> 8
<211> 524
<212> PRT
<213> *Arabidopsis thaliana*

55 <400> 8
Met Thr Asn Thr Leu Cys Leu Ser Leu Ile Thr Leu Ile Thr Leu Phe
1 5 10 15
Ile Ser Leu Thr Pro Thr Leu Ile Lys Ser Asp Glu Gly Ile Asp Val
20 25 30
60

Phe Leu Pro Ile Ser Leu Asn Leu Thr Val Leu Thr Asp Pro Phe Ser
35 40 45

5 Ile Ser Ala Ala Ser His Asp Phe Gly Asn Ile Thr Asp Glu Asn Pro
50 55 60

Gly Ala Val Leu Cys Pro Ser Ser Thr Thr Glu Val Ala Arg Leu Leu
65 70 75 80

10 Arg Phe Ala Asn Gly Gly Phe Ser Tyr Asn Lys Gly Ser Thr Ser Pro
85 90 95

Ala Ser Thr Phe Lys Val Ala Ala Arg Gly Gln Gly His Ser Leu Arg
100 105 110

15 Gly Gln Ala Ser Ala Pro Gly Gly Val Val Val Asn Met Thr Cys Leu
115 120 125

20 Ala Met Ala Ala Lys Pro Ala Ala Val Val Ile Ser Ala Asp Gly Thr
130 135 140

Tyr Ala Asp Val Ala Ala Gly Thr Met Trp Val Asp Val Leu Lys Ala
145 150 155 160

25 Ala Val Asp Arg Gly Val Ser Pro Val Thr Trp Thr Asp Tyr Leu Tyr
165 170 175

Leu Ser Val Gly Gly Thr Leu Ser Asn Ala Gly Ile Gly Gln Thr
180 185 190

30 Phe Arg His Gly Pro Gln Ile Ser Asn Val His Glu Leu Asp Val Ile
195 200 205

35 Thr Gly Lys Gly Glu Met Met Thr Cys Ser Pro Lys Leu Asn Pro Glu
210 215 220

Leu Phe Tyr Gly Val Leu Gly Gly Leu Gly Gln Phe Gly Ile Ile Thr
225 230 235 240

40 Arg Ala Arg Ile Ala Leu Asp His Ala Pro Thr Arg Val Lys Trp Ser
245 250 255

Arg Ile Leu Tyr Ser Asp Phe Ser Ala Phe Lys Arg Asp Gln Glu Arg
260 265 270

45 Leu Ile Ser Met Thr Asn Asp Leu Gly Val Asp Phe Leu Glu Gly Gln
275 280 285

50 Leu Met Met Ser Asn Gly Phe Val Asp Thr Ser Phe Phe Pro Leu Ser
290 295 300

Asp Gln Thr Arg Val Ala Ser Leu Val Asn Asp His Arg Ile Ile Tyr
305 310 315 320

55 Val Leu Glu Val Ala Lys Tyr Tyr Asp Arg Thr Thr Leu Pro Ile Ile
325 330 335

Asp Gln Val Ile Asp Thr Leu Ser Arg Thr Leu Gly Phe Ala Pro Gly
340 345 350

60

Phe Met Phe Val Gln Asp Val Pro Tyr Phe Asp Phe Leu Asn Arg Val
355 360 365

5 Arg Asn Glu Glu Asp Lys Leu Arg Ser Leu Gly Leu Trp Glu Val Pro
370 375 380

His Pro Trp Leu Asn Ile Phe Val Pro Gly Ser Arg Ile Gln Asp Phe
385 390 395 400

10 His Asp Gly Val Ile Asn Gly Leu Leu Asn Gln Thr Ser Thr Ser
405 410 415

Gly Val Thr Leu Phe Tyr Pro Thr Asn Arg Asn Lys Trp Asn Asn Arg
420 425 430

15 Met Ser Thr Met Thr Pro Asp Glu Asp Val Phe Tyr Val Ile Gly Leu
435 440 445

20 Leu Gln Ser Ala Gly Gly Ser Gln Asn Trp Gln Glu Leu Glu Asn Leu
450 455 460

Asn Asp Lys Val Ile Gln Phe Cys Glu Asn Ser Gly Ile Lys Ile Lys
465 470 475 480

25 Glu Tyr Leu Met His Tyr Thr Arg Lys Glu Asp Trp Val Lys His Phe
485 490 495

Gly Pro Lys Trp Asp Asp Phe Leu Arg Lys Lys Ile Met Phe Asp Pro
500 505 510

30 Lys Arg Leu Leu Ser Pro Gly Gln Asp Ile Phe Asn
515 520

35 <210> 9
<211> 2805
<212> DNA
<213> *Arabidopsis thaliana*

40 <400> 9
atgacgtcaa gctttttct cctgacgttc gccatatgta aactgatcat agccgtgggt
60
45 ctaaacgtgg gccccagtga gctccctccgc atcggagcca tagatgtcga cggccacttc
120
accgtccacc cttccgactt agcctccgtc tcctcagact tcggtatgtc gaagtcaccc
180
gaagagccat tggccgtgct tcatccatca tcggccgaag acgtggcacg actcgtcaga
240
50 acagcttacg gttcagccac ggcgtttccg gtctcagccc gaggccacgg ccattccata
300
aacggacaag ccgcggcggg gaggaacgggt gtggtggttg aatgaacca cggcgtaacc
360
55 gggacgcccc a gccactcgt ccgaccggat gaaatgtatg tggatgtatg gggtgagag
420
ttatgggtcg atgtgttcaa gaaaacgttg gagcatggct tagcaccaaa atcatggacg
480
gattacttgt atctaaccgt tggaggtaca ctctccaatg caggaatcag tggtaagct
540

tcctagacca aaccgatctc aacgaaccct ccgcacatca ttgatttata cattaatata
2400
gatattgtcg ttgctgacgt gtcgtaattt gatgttattt tcagatggga cgagaggagc
2460
5 tcagccgtga cgccggatga ggaagtttc tatctggtgg ctctatttag atcagctta
2520
acggacggtg aagagacaca gaagcttagag tatctgaaag atcagaaccg tcggatctg
2580
10 gagttctgtg aacaagccaa gatcaatgtg aagcagtatc ttccctcacca cgcaacacag
2640
gaagagtggg tggctcattt tgggacaag tgggatcggt tcagaagctt aaaggctgag
2700
tttgatccgc gacacatact cgctactggt cagagaatct ttcaaaaaccc atctttgtct
2760
15 ttgtttcctc cgtcgtcgtc ttcttcgtca gcggcttcat ggtga
2805

20 <210> 10
<211> 536
<212> PRT
<213> *Arabidopsis thaliana*

25 <400> 10
Met Thr Ser Ser Phe Leu Leu Leu Thr Phe Ala Ile Cys Lys Leu Ile
1 5 10 15

30 Ile Ala Val Gly Leu Asn Val Gly Pro Ser Glu Leu Leu Arg Ile Gly
20 25 30

35 Ala Ile Asp Val Asp Gly His Phe Thr Val His Pro Ser Asp Leu Ala
35 40 45

40 Ser Val Ser Ser Asp Phe Gly Met Leu Lys Ser Pro Glu Glu Pro Leu
50 55 60

45 Ala Val Leu His Pro Ser Ser Ala Glu Asp Val Ala Arg Leu Val Arg
65 70 75 80

50 Thr Ala Tyr Gly Ser Ala Thr Ala Phe Pro Val Ser Ala Arg Gly His
85 90 95

55 Gly His Ser Ile Asn Gly Gln Ala Ala Ala Gly Arg Asn Gly Val Val
100 105 110

60 Val Glu Met Asn His Gly Val Thr Gly Thr Pro Lys Pro Leu Val Arg
115 120 125

65 Pro Asp Glu Met Tyr Val Asp Val Trp Gly Gly Glu Leu Trp Val Asp
130 135 140

70 Val Leu Lys Lys Thr Leu Glu His Gly Leu Ala Pro Lys Ser Trp Thr
145 150 155 160

75 Asp Tyr Leu Tyr Leu Thr Val Gly Gly Thr Leu Ser Asn Ala Gly Ile
165 170 175

80 Ser Gly Gln Ala Phe His His Gly Pro Gln Ile Ser Asn Val Leu Glu
180 185 190

Leu Asp Val Val Thr Gly Lys Gly Glu Val Met Arg Cys Ser Glu Glu
195 200 205

5 Glu Asn Thr Arg Leu Phe His Gly Val Leu Gly Gly Leu Gly Gln Phe
210 215 220

Gly Ile Ile Thr Arg Ala Arg Ile Ser Leu Glu Pro Ala Pro Gln Arg
225 230 235 240

10 Val Arg Trp Ile Arg Val Leu Tyr Ser Ser Phe Lys Val Phe Thr Glu
245 250 255

Asp Gln Glu Tyr Leu Ile Ser Met His Gly Gln Leu Lys Phe Asp Tyr
260 265 270

15 Val Glu Gly Phe Val Ile Val Asp Glu Gly Leu Val Asn Asn Trp Arg
275 280 285

20 Ser Ser Phe Phe Ser Pro Arg Asn Pro Val Lys Ile Ser Ser Val Ser
290 295 300

Ser Asn Gly Ser Val Leu Tyr Cys Leu Glu Ile Thr Lys Asn Tyr His
305 310 315 320

25 Asp Ser Asp Ser Glu Ile Val Asp Gln Glu Val Glu Ile Leu Met Lys
325 330 335

Lys Leu Asn Phe Ile Pro Thr Ser Val Phe Thr Thr Asp Leu Gln Tyr
340 345 350

30 Val Asp Phe Leu Asp Arg Val His Lys Ala Glu Leu Lys Leu Arg Ser
355 360 365

Lys Asn Leu Trp Glu Val Pro His Pro Trp Leu Asn Leu Phe Val Pro
370 375 380

35 Lys Ser Arg Ile Ser Asp Phe Asp Lys Gly Val Phe Lys Gly Ile Leu
385 390 395 400

40 Gly Asn Lys Thr Ser Gly Pro Ile Leu Ile Tyr Pro Met Asn Lys Asp
405 410 415

Lys Trp Asp Glu Arg Ser Ser Ala Val Thr Pro Asp Glu Glu Val Phe
420 425 430

45 Tyr Leu Val Ala Leu Leu Arg Ser Ala Leu Thr Asp Gly Glu Glu Thr
435 440 445

Gln Lys Leu Glu Tyr Leu Lys Asp Gln Asn Arg Arg Ile Leu Glu Phe
450 455 460

Cys Glu Gln Ala Lys Ile Asn Val Lys Gln Tyr Leu Pro His His Ala
465 470 475 480

50 Thr Gln Glu Glu Trp Val Ala His Phe Gly Asp Lys Trp Asp Arg Phe
485 490 495

Arg Ser Leu Lys Ala Glu Phe Asp Pro Arg His Ile Leu Ala Thr Gly
500 505 510

60

Gln Arg Ile Phe Gln Asn Pro Ser Leu Ser Leu Phe Pro Pro Ser Ser
515 520 525

Ser Ser Ser Ser Ala Ala Ser Trp
5 530 535

10 <210> 11
<211> 1936
<212> DNA
<213> *Arabidopsis thaliana*

15 <400> 11
atgcctatacg taagaagttt caccatcttgc ttctcagct gcatacgctt taagttggct
60 tgctgcttct ctagcagcat ttcttctttg aaggcgcttc ccctagtagg ccatttggag
120 tttgaacatg tccatcacgc ctccaaagat tttggaaatc gataccagtt gatccctttg
180 gccgtcttac atcccaaatc ggtaagcgcac atcgccctcaa cgatacgaca catctggatg
240 atgggcactc attcacagct tacagtggca gcgagaggc gtggacattc actccaaggc
300 250 caagctcaaa caagacatgg aattgttata cacatggaaat cactccatcc ccagaagctg
360 cagggtctaca gtgtggattc ccctgctcca tatgttgcattg tgcgtggatgg tgagctgtgg
420 ataaacattt tgcatgagac cctcaagtac gggcttgcac caaaatcatg gacggattac
480 ctgcatttaa ctgttaggtgg tactctgtcc aatgctggaa taagcggcca ggcattccga
540 catggaccac agatcagcaa tggatcatcaa ctggagattt tcacaggta gttcagagtt
600 350 gcaatgtttcg tgtttgaaa gcatagactc tatatggttt gtgactattt acaacatgaa
660 gagattcccg agaatacgta cccactaatg tcatgcctat ttattgactg cagaaaaagg
720 400 cgagatccta aactgtacaa agaggcagaa cagcgactta ttaatgggtt ttcttggatgg
780 ttttaggtcag tttggcatca taacgcgggc aagaatagca ttggaaaccag caccaaccat
840 ggttaaacaat aaataaaataa aaaacttaaa aactgaacac gcgtgtgtcc tcctaactct
900 450 gtataatgga caggtaaaat ggataagagt gttatacctt gatttgcag cttttgccaa
960 ggaccaagag caactaatat ctgcccaggcc ccacaaaattt gattacatag aagggtttgt
1020 500 gataataaac aggacaggcc tcctgaacag ctggagggtt tctttcaccc cagaagagcc
1080 ttttagaagca agccaattca agtttgcattt aaggactctt tattgtctgg agctagccaa
1140 gtatttgcattt caagataaca aagacgtaat caaccagggtt agaaaacaga gtagaagccaa
1200 550 tcggtagaat cttctttggc agatgcattt cattggactt gaaaatataat atatatttgc
1260 ccaatccagg aagtggaaaga aacattatca gagctaaatc acgtgacgtc gacactgttt
1320 600 acaacggagg tagcatatga agcattcttgc gacagggttac atgtgtctga ggtaaaactc
1380

cgatcgaaag ggcagtggga ggtgccacat ccatggctga acctcctgg accaagaagc
1440
aaaatcaatg aatttgcaag aggtgtattt ggaaacatac taacggatac aagcaacggc
1500
5 ccagtcatcg tctaccagt gaacaaatca aagtaagaaa gaaagaaaaga aagagctagt
1560
catgattttg tttctttca cttgttgaca aaacaaaagc atgttggta gcagggtgg
1620
10 caatcaaaca tcagcagtaa caccggagga agaggtattc tacctggtgg cgatccta
1680
atccggcatct ccagggtcgg cagggaaagga tggagtagaa gagatcttga ggcggAACAG
1740
aagaatactg gaattcagtg aagaagcagg gatagggttg aagcagttac tgccacatta
1800
15 cacgacaaga gaagagtggaa gatcccattt cggggacaag tggggagaat ttgtgaggag
1860
gaaatccaga tatgatccat tggcaattct tgcgcctggc caccgaattt ttcaaaaggc
1920
20 agtctcatac tcatga
1936

25 <210> 12
<211> 504
<212> PRT
<213> *Arabidopsis thaliana*

30 <400> 12
Met Leu Ile Val Arg Ser Phe Thr Ile Leu Leu Ser Cys Ile Ala
1 5 10 15

Phe Lys Leu Ala Cys Cys Phe Ser Ser Ser Ile Ser Ser Leu Lys Ala
20 25 30

35 Leu Pro Leu Val Gly His Leu Glu Phe Glu His Val His His Ala Ser
35 40 45

Lys Asp Phe Gly Asn Arg Tyr Gln Leu Ile Pro Leu Ala Val Leu His
50 55 60

40 Pro Lys Ser Val Ser Asp Ile Ala Ser Thr Ile Arg His Ile Trp Met
65 70 75 80

45 Met Gly Thr His Ser Gln Leu Thr Val Ala Ala Arg Gly Arg Gly His
85 90 95

Ser Leu Gln Gly Gln Ala Gln Thr Arg His Gly Ile Val Ile His Met
100 105 110

50 Glu Ser Leu His Pro Gln Lys Leu Gln Val Tyr Ser Val Asp Ser Pro
115 120 125

Ala Pro Tyr Val Asp Val Ser Gly Gly Glu Leu Trp Ile Asn Ile Leu
130 135 140

55 His Glu Thr Leu Lys Tyr Gly Leu Ala Pro Lys Ser Trp Thr Asp Tyr
145 150 155 160

60 Leu His Leu Thr Val Gly Gly Thr Leu Ser Asn Ala Gly Ile Ser Gly
165 170 175

Gln Ala Phe Arg His Gly Pro Gln Ile Ser Asn Val His Gln Leu Glu
180 185 190

5 Ile Val Thr Gly Lys Gly Glu Ile Leu Asn Cys Thr Lys Arg Gln Asn
195 200 205

Ser Asp Leu Phe Asn Gly Val Leu Gly Gly Leu Gly Gln Phe Gly Ile
210 215 220

10 Ile Thr Arg Ala Arg Ile Ala Leu Glu Pro Ala Pro Thr Met Asp Gln
225 230 235 240

Glu Gln Leu Ile Ser Ala Gln Gly His Lys Phe Asp Tyr Ile Glu Gly
15 245 250 255

Phe Val Ile Ile Asn Arg Thr Gly Leu Leu Asn Ser Trp Arg Leu Ser
260 265 270

20 Phe Thr Ala Glu Glu Pro Leu Glu Ala Ser Gln Phe Lys Phe Asp Gly
275 280 285

Arg Thr Leu Tyr Cys Leu Glu Leu Ala Lys Tyr Leu Lys Gln Asp Asn
290 295 300

25 Lys Asp Val Ile Asn Gln Glu Val Lys Glu Thr Leu Ser Glu Leu Ser
305 310 315 320

Tyr Val Thr Ser Thr Leu Phe Thr Thr Glu Val Ala Tyr Glu Ala Phe
30 325 330 335

Leu Asp Arg Val His Val Ser Glu Val Lys Leu Arg Ser Lys Gly Gln
340 345 350

35 Trp Glu Val Pro His Pro Trp Leu Asn Leu Leu Val Pro Arg Ser Lys
355 360 365

Ile Asn Glu Phe Ala Arg Gly Val Phe Gly Asn Ile Leu Thr Asp Thr
370 375 380

40 Ser Asn Gly Pro Val Ile Val Tyr Pro Val Asn Lys Ser Lys Trp Asp
385 390 395 400

Asn Gln Thr Ser Ala Val Thr Pro Glu Glu Val Phe Tyr Leu Val
45 405 410 415

Ala Ile Leu Thr Ser Ala Ser Pro Gly Ser Ala Gly Lys Asp Gly Val
420 425 430

50 Glu Glu Ile Leu Arg Arg Asn Arg Arg Ile Leu Glu Phe Ser Glu Glu
435 440 445

Ala Gly Ile Gly Leu Lys Gln Tyr Leu Pro His Tyr Thr Thr Arg Glu
450 455 460

55 Glu Trp Arg Ser His Phe Gly Asp Lys Trp Gly Glu Phe Val Arg Arg
465 470 475 480

Lys Ser Arg Tyr Asp Pro Leu Ala Ile Leu Ala Pro Gly His Arg Ile
60 485 490 495

Phe Gln Lys Ala Val Ser Tyr Ser
500

5

<210> 13
<211> 31
<212> DNA
10 <213> Artificial Sequence

<220>
<223> Description of Artificial Sequence:oligonucleotide
: primer or probe

15 <400> 13
cggtcgacat gggattgacc tcatccttac g
31

20 <210> 14
<211> 35
<212> DNA
25 <213> Artificial Sequence

<220>
<223> Description of Artificial Sequence:oligonucleotide
: primer or probe

30 <400> 14
gcgtcgactt atacagttct aggtttcggc agtat
35

35 <210> 15
<211> 33
<212> DNA
<213> Artificial Sequence

40 <220>
<223> Description of Artificial Sequence:oligonucleotide
: primer or probe

<400> 15
45 gccgttaccag agagagaaac ataaacaaat ggc
33

50 <210> 16
<211> 31
<212> DNA
<213> Artificial Sequence

<220>
55 <223> Description of Artificial Sequence:oligonucleotide
: primer or probe

<400> 16
gccgttaccca attttacttc caccaaaaatg c
60 31

5 <210> 17
 <211> 34
 <212> DNA
 <213> Artificial Sequence

10 <220>
 <223> Description of Artificial Sequence:oligonucleotide
 : primer or probe

 <400> 17
 gcggtagccattgataag aatcaagcta ttca
 34
15

20 <210> 18
 <211> 31
 <212> DNA
 <213> Artificial Sequence

 <220>
 <223> Description of Artificial Sequence:oligonucleotide
 : primer or probe
25
 <400> 18
 gcggtagccaaagtggtag aacgactaac a
 31

30
 <210> 19
 <211> 28
 <212> DNA
 <213> Artificial Sequence
35
 <220>
 <223> Description of Artificial Sequence:oligonucleotide
 : primer or probe

40 <400> 19
 gcggtagccccattnaaccta cccgtttg
 28

45 <210> 20
 <211> 32
 <212> DNA
 <213> Artificial Sequence

50 <220>
 <223> Description of Artificial Sequence:oligonucleotide
 : primer or probe

 <400> 20
55 gcggtagccaggacatgaacgtacttgtctgtat
 32

60 <210> 21
 <211> 28

<212> DNA
<213> Artificial Sequence

5 <220>
<223> Description of Artificial Sequence:oligonucleotide
: primer or probe

<400> 21
10 ggggtacctt gatgaatcgt gaaatgac
28

<210> 22
<211> 31
15 <212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence:oligonucleotide
20 : primer or probe

<400> 22
ggggtaccct ttcctttgg ttttgtcctg t
31
25

<210> 23
<211> 32
<212> DNA
30 <213> Artificial Sequence

<220>
<223> Description of Artificial Sequence:oligonucleotide
35 : primer or probe
<400> 23
gctctagatc aggaaaagaa ccatgcttat ag
32

40
<210> 24
<211> 32
<212> DNA
<213> Artificial Sequence

45 <220>
<223> Description of Artificial Sequence:oligonucleotide
: primer or probe

50 <400> 24
gctctagatc atgagtatga gactgcctt tg
32

55 <210> 25
<211> 1728
<212> DNA
<213> Arabidopsis thaliana

60 <400> 25

atgggattga cctcatcctt acggttccat agacaaaaca acaagactt cctcgaaatc
60
ttcatgatct tagttctaaag ctgtataccca ggtagaacca atctttgttc caatcattct
120
5 gtttagtaccc caaaaagaatt accttcttca aatccttcag atattcggttc ctcattagtt
180
tcactagatt tggagggtta tataagcttc gacgatgtcc acaatgtggc caaggacttt
240
10 ggcacacagat accagttacc acctttggca attctacatc caaggtcagt ttttgatatt
300
tcatcgatga tgaagcatat agtacatctg ggctccaccc caaatcttac agtagcagct
360
agaggccatg gtcactcgct tcaaggacaa gctctagctc atcaagggtgt tgcataaaa
420
15 atggagtcac ttcaaggatcc tgatatcagg atttataagg ggaagcaacc atatgttgat
480
gtctcagggtg gtgaaatatg gataaacatt ctacgcgaga ctctaaaata cggtctttca
540
20 ccaaagtccct ggacagacta ctttcatttg accgttggag gtacactatc taatgctgga
600
atcagcggtc aagcattcaa gcatggaccc caaatcaaca acgtctacca gctagagatt
660
gttacaggga aaggagaagt cgtaacctgt tctgagaagc ggaattctga acttttcttc
720
25 agtgttcttg gcgggcttgg acagtttggc ataatcaccc gggcacggat ctctcttggaa
780
ccagcaccgc atatggttaa atggatcagg gtactctact ctgacttttc tgcattttca
840
30 agggaccaag aatatctgat ttcaaggag aaaaacttttgg attacgttga aggatttgg
900
ataatcaata gaacagaccc tctcaataat tggcgatcgt cattcagtcc caacgattcc
960
acacaggcaa gcagattcaa gtcagatggg aaaaactcttt attgcctaga agtggtaaaa
1020
35 tatttcaacc cagaagaagc tagctctatg gatcaggaaa ctggcaagtt actttcagag
1080
ttaaattata ttccatccac tttgtttca tctgaagtgc catatatcga gtttctggat
1140
40 cgcgtgcata tcgcagagag aaaaactaaga gcaaagggtt tatgggaggt tccacatccc
1200
tggctgaatc tccctgattcc taagagcagc atataccat ttgctacaga agtttcaac
1260
aacattctca caagcaacaa caacggctt atccttattt atccagtcaa tcaatccaag
1320
45 tggaaagaaac atacatcttt gataactcca aatgaagata tattctatct cgtgccttt
1380
ctccccctctg cagtgcacaa ttccctcaggaa aaaaacgcgtc tagagtaccc tttgaaacaa
1440
50 aacccaaagag ttatgaactt ctgcgcagca gcaaaccctca acgtgaagca gtatggccc
1500
cattatgaaa ctcaaaaaga gtggaaatca cactttggca aaagatggga aacatttgca
1560
cagaggaaac aagcctacga ccctctagcg attctacgcac ctggccaaag aatattccaa
1620
55 aagacaacag gaaaattatc tcccatccaa ctgcacaaatc caaaggcaac aggaagtcct
1680
caaagggtacc attacgcac aatactgccg aaacctagaa ctgtataaa
1728

<210> 26
<211> 1506
<212> DNA
<213> Arabidopsis thaliana
5
<400> 26
atggctaatc ttcgttaat gatcaactta atcacggttt taatgatcac caaatcatca
60
aacggattta aaattgattt acctaaatcc cttaacctca ccctctctac cgatccttcc
120
atcatctccg cagcctctca tgacttcgga aacataacca ccgtgacccc cggcggcgta
180
atctgcccct cctccaccgc tgatatctct cgtctcctcc aatacgccgc aaacggaaaa
240
15 agtacattcc aagttagcgcc tcgtggccaa ggccactcct taaacggcca agcctcggtc
300
tccggcggag taatcgtaa catgacgtgt atcaactgacg tggtggttcc aaaagacaag
360
20 aagtacgctg acgtggcgcc cgggacgtta tgggtggatg tgcttaagaa gacggcggag
420
aaagggggtgt cgccggtttc ttggacggat tatttgcata taaccgtcgg aggaacgttg
480
tcgaatggtg gaattggtgg tcaagtgttt cgaaacggtc ctcttggtag taacgtcctt
540
25 gaattggacg ttattactgg gaaagggtgaa atgttgacat gctcgcgaca gctaaaccca
600
gaattgttct atggagtgtt aggaggttt ggtcaatttg gaattataac gagagccaga
660
30 attgtttgg accatgcacc taaacgggcc aaatggttc ggatgctcta cagtgatttc
720
acaactttta caaaggacca agaacgtttg atatcaatgg caaacgatat tggagtcgac
780
tatttagaag gtcaaataatt tctatcaaac ggtgtcggtt acacctctt tttcccacct
840
35 tcagatcaat ctaaagtgc tgatctagtc aagcaacacg gtatcatcta tggatgttggaa
900
gtagccaagt attatgatga tcccaatctc cccatcatca gcaaggttat tgacacattta
960
40 acgaaaacat taagttactt gcccgggttc atatcaatgc acgacgtggc ctacttcgat
1020
ttcttgaacc gtgtacatgt cgaagaaaat aaactcagat ctttgggatt atggaaactt
1080
cctcatcctt ggcttaacct ctacgttcct aaatctcgga ttctcgattt tcataacggt
1140
45 gttgtcaaag acattttct taagaaaaaa tcagcttcgg gactcgctct tctctatcca
1200
acaaaccgga ataaatggga caatcgtatg tcggcgatga taccagagat cgatgaagat
1260
50 gtttatataa ttatcgact actacaatcc gctaccccaa aggatcttcc agaagtggag
1320
agcgttaacg agaagataat taggtttgc aaggattcag gtattaagat taagcaatat
1380
55 ctaatgcatt atactagtaa agaagattgg attgagcatt ttggatcaaa atggatgtat
1440
ttttcgaaga ggaaagatct atttgatccc aagaaactgt tatctccagg gcaagacatc
1500
ttttga
1506

<210> 27
<211> 1572
<212> DNA
<213> Arabidopsis thaliana
5
<400> 27
atggcgagtt ataatcttcg ttcacaagg cgctttatag caataacaat agtaatcatc
60
attactctct caactccgat cacaaccaac acatcaccac aaccatggaa tattttca
10
120
cacaacgaat tcgcccggaaa actcacctcc tcctcttcct ccgtcgaatc agccgccaca
180
gatttcggcc acgtcaccaa aatcttcct tcggccgtct taatcccttc ctccgttgaa
240
15
gacatcacag atctcataaa actctctttt gactctcaac tgcgtttcc tttagccgct
300
cgtggtcacg gacacagcca ccgtggccaa gcctcggcta aagacggagt tgcgttcaac
360
atgcggtcca tggtaaaccg ggatcgaggt atcaagggtt ctggacctg tttatatgtt
420
40
gacgtggacg ctgcgtggct atggatttagt gtgttgaata aaactttgga gttagggtta
480
acgcgggttt ctggacgga ttatttgat ttaacagtgc gtggacggtt atcaaacggc
540
25
50
ggaatttagtg gacaaacggt tcggtacggt ccacagatca ctaatgttct agagatggat
600
gttattactg gaaaaggaga gattgcaact tgcgttcaagg acatgaactc ggatctttc
660
ttcgccgtgt taggaggtt gggtaattt ggcattataa caagagccag aattaaactt
720
780
gaagtagctc cgaaaagggc caagtggta aggtttctat acatagattt ctccgaattt
840
acaagagatc aagaacgagt gatatcgaaa acggacggtg tagatttctt agaagggttcc
35
800
attatggtg accatggccc accggataac tggagatcca cgtattatcc accgtccgat
900
960
cacttgagga tcgcctcaat ggtcaaacga catcggtca tctactgcct tgaagtcgtc
1020
aagtattacg acgaaacttc tcaatacaca gtcaacgagg aaatggagga gttaagcgtat
1080
1140
40
460
aattttaaacc atgtaagagg gtttatgtac gagaaagatg tgacgtatat ggatttccta
1200
aaccggatcc gaaccggaga gctaaacctg aaatccaaag gccaatggga tgttccacat
1260
45
520
ccatggctta atctttcgat accaaaaact caaatctcca aatttgatga tgggttttt
1320
aagggttata tcctaagaaa taacatcaact agcggtcctg ttcttgcata tcctatgaat
1380
cgcacaaagt ggaatgatcg gatgtctgcc gctatacccg aggaagatgt attttatgcg
1440
50
560
gtagggtttt taagatccgc gggttttgac aattgggagg cttttgcata agaaaacatg
1500
aaataactga agtttgcata ggtgcataat atgggggtta tacaatatct tccttatcat
1560
55
60
tcatcacaag aaggatgggt tagacatggt ggtccgaggt ggaatatttt cgttagagaga
aaatataaaat atgatccaa aatgatatta tcaccggac aaaatatatt tcaaaaaata
aactcgagtt ag
1572

5 <210> 28
5 <211> 1575
5 <212> DNA
5 <213> *Arabidopsis thaliana*

10 <400> 28
10 atgactaata ctctctgttt aagcctcatc accctaataa cgcttttat aagtttaacc
10 60
10 ccaacacctaa tcaaattcaga tgagggcatt gatgtttct tacccatatac actcaacctt
10 120
10 acggtcctaa ccgatccctt ctccatctct gccgcttctc acgacttcgg taacataacc
10 180
15 gacgaaaatc ccggcgccgt cctctgcctt tcctccacca cggaggtggc tcgtctccctc
15 240
15 cgtttcgcta acggaggatt ctcttacaat aaaggctcaa ccagccccgc gtctactttc
15 300
15 aaagtggctg ctcgaggcca aggccactcc ctccgtggcc aagcctctgc acccggaggt
20 360
20 gtcgtcgtga acatgacgtg ttcgcctatg gcggctaaac cagcggcggt tggttatctcg
20 420
20 gcagacggga cttacgctga cgtggctgcc gggacgatgt gggtggatgt tctgaaggcg
20 480
25 gcgggtggata gaggcgtctc gccggttaca tggacggatt atttgtatct cagcgtcggc
25 540
25 gggacgttgt cgaacgctgg aatcggtggt cagacgttta gacacggccc tcagattagt
30 600
30 aacgttcatg agcttgacgt tattaccgga aaaggtgaaa tgatgacttg ctctccaaag
30 660
30 ttaaaccctgt aattgttcta tggagttta ggaggtttgg gtcaattcgg tattataacg
30 720
30 agggccagga ttgcgttggc tcatgcaccc acaagggtga aatggtctcg catactctac
30 780
35 agtgacttct cggctttaa aagagaccaa gagcgtttaa tatcaatgac caatgatctc
35 840
35 ggagttgact ttttggagg tcaactttagt atgtcaaatg gctcgtaga cacctcttc
35 900
40 ttcccaactct ccgatcaaac aagagtgcga tctctgtga atgaccaccc gatcatctat
40 960
40 gttctcgaag tagccaagta ttatgacaga accacccttc ccattattga ccaggtgatt
40 1020
40 gacacgttaa gtagaactct aggtttcgct ccagggttta tgttcgtaca agatgttccg
40 1080
45 tatttcgatt tcttgaacccg tgtccgaaac gaagaagata aactcagatc tttaggacta
45 1140
45 tggaagttc ctcatccatg gcttaacatc tttgtcccg ggtctcgaat ccaagattt
45 1200
50 catgatggtg ttattaatgg ccttcttcta aaccaaacct caacttctgg tgttactctc
50 1260
50 ttctatccca caaaccgaaa caaatggAAC aaccgcgtgt caacgtatgc accggacgaa
50 1320
50 gatgtttttt atgtgatcgg attactgcaa tcagctggc gatctaaaa ttggcaagaa
50 1380
55 cttggaaaatc tcaacgcacaa ggttattcag ttttgaaactcggaaat taagattaag
55 1440
55 gaatatttga tgcactatac aagaaaaagaa gattgggtta aacattttgg accaaaaatgg
55 1500
60 gatgattttt taagaaaagaa aattatgttt gatccaaaaa gactattgtc tccaggacaa
60 1560

gacatattta attaa
1575

5 <210> 29
<211> 1611
<212> DNA
<213> *Arabidopsis thaliana*

10 <400> 29
atgacgtcaa gctttttct cctgacgttc gccatatgta aactgatcat agccgtgggt
60
ctaaacgtgg gccccagtga gtcctccgc atcggagcca tagatgtcga cggccacttc
120

15 accgtccacc ctccgactt agcctccgtc tcctcagact tcggtatgct gaagtcaccc
180
gaagagccat tggccgtgct tcatccatca tcggccgaag acgtggcacg actcgtcaga
240

20 acagcttacg gttcagccac ggcgtttccg gtctcagccc gaggccacgg ccattccata
300
aacggacaag ccgcggcggg gaggaacggt gtgggtggttg aaatgaacca cggcgtaacc
360

25 gggacgccccca agccactcgt ccgaccggat gaaatgtatg tggatgtatg ggggtggagag
420

30 ttatgggtcg atgtgttcaa gaaaacgttg gagcatggct tagcacccaa atcatggacg
480
gattacttgt atctaaccgt tggaggtaca ctctccaaatg caggaatcag tggtaagct
540

35 tttcaccatg gtcctccaaat tagtaacgtc cttgagctcg acgttgtaac tggggaaagga
600
gaggtgatga gatgctcaga agaagagaac acaaggctat tccatggagt tcttgggtgga
660

40 ttaggtcaat ttgggatcat cactcgagca cgaatctctc tcgaaccagc tccccaaagg
720

45 gtgagatgga tacgggtatt gtattcgagc ttcaaagtgt ttacggagga ccaagagttac
780
ttaatctcaa tgcattgtca attaaagttt gattacgtgg aagggtttgt gattgtggac
840

50 gaaggactcg tcaacaattt gagatcttct ttcttctctc cacgtAACCC cgtcaagatc
900
tcctctgtta gttccaaacgg ctctgtttt tattgccttgc agatcacccaa gaactaccac
960

55 gactccgact ccgaaatcgt tgatcaggaa gttgagattc tgatgaagaa attgaatttc
1020

60 ataccgacat cggcttttac aacggattt caatatgtgg actttctcgac ccgggtacac
1080
aaggccgaat tgaagctccg gtccaaagaat ttatgggagg ttccacaccc atggctcaac
1140

65 ctcttcgtgc caaaatcaag aatctctgac ttgcataaag gcttttcaa gggcattttt
1200
ggaaataaaaaa caagtggccc tattcttatac taccggatca acaaagacaa atgggacgag
1260

70 agaggactcg ccgtgacgccc ggatgaggaa gtttctatc tgggtggctt attgagatca
1320

75 gctttaacgg acggtaaga gacacagaag ctagagtatc tgaaagatca gaaccgtcg
1380
atcttggagt tctgtgaaca agccaagatc aatgtgaagc agtacatcttcc tcaccacgca
1440

80 acacaggaag agtgggtggc tcattttggg gacaagtggg atcggttcag aagcttaaag
1500

gctgagtttgc atccgcgaca cataactcgct actggtcaga gaatcttca aaaccatct
1560
ttgtctttgt ttcctccgtc gtcgtttct tcgtcagcgg cttcatggtg a
1611
5
<210> 30
<211> 1515
<212> DNA
10 <213> *Arabidopsis thaliana*

<400> 30
atgcttatag taagaagttt caccatcttgc cttctcagct gcatagcctt taagttggct
60
15 tgcgtttct ctagcagcat ttcttctttg aaggcgcttc ccctagtagg ccattggag
120
tttgaacatg tccatcacgc ctccaaagat tttggaaatc gataccagtt gatccctttg
180
20 gccgtttac atccaaatc ggtaagcgcac atgcctcaa cgatacgaca catctggatg
240
atgggcactc attcacagct tacagtggca gcgagaggc gtggacattc actccaaggc
300
25 caagctcaaa caagacatgg aattgttata cacatggaaat cactccatcc ccagaagctg
360
ataaaacattt tgcatgagac cctcaagtac gggcttgcac caaaatcatg gacggattac
420
30 ctgcatttaa ctgttaggtgg tactctgtcc aatgctggaa taagcggcca ggcattccga
540
catggaccac agatcagcaa tggtcatcaa ctggagatttgc tcacaggaaa aggcgagatc
600
35 ctaaaactgtt caaagaggca gaacagcgcac ttatttaatg gtgttcttgg tggtttaggt
660
cagtttggca tcataacgcg ggcaagaata gcatttggaaac cagcaccaac catggaccaa
720
gagcaactaa tatctgccc gggccacaaa ttcgattaca tagaagggtt tgtgataata
780
40 aacaggacag gcctctgaa cagctggagg ttgtttca ccgcagaaga gccttagaa
840
gcaagccaat tcaagttga tggaggact ctgtattgtc tggagcttagc caagtatttg
900
aagcaagata acaaagacgt aatcaaccag gaagtggaaag aaacattatc agagctaagc
960
45 tacgtgacgt cgacactgtt tacaacggag gtagcatatg aagcattttt ggacagggtt
1020
catgtgtctg aggtaaaact ccgatcgaaa gggcagtggg aggtgccaca tccatggctg
1080
50 aacctcctgg taccaagaag caaaatcaat gaatttgcggaa gaggtgtatt tggaaacata
1140
ctaacggata caagcaacgg cccagtcattc gtctacccag tgaacaaatc aaagtgggac
1200
aatcaaaacat cagcagtaac accggaggaa gaggtattct acctgggtggc gatcctaaca
1260
55 tcggcatctc cagggtcggc agggaaaggat ggagtagaag agatcttgcg gcgaaacaga
1320
agaataactgg aattcagtga agaagcaggat atagggttgc agcagttatct gccacattac
1380
60 acgacaagag aagagtggag atcccatttc ggggacaagt ggggagaatt tgtgaggagg
1440

aatccagat atgatccatt ggcaattctt gcgcctggcc accgaatttt tcaaaaggca
1500
gtctcatact catga
1515
5

<210> 31
<211> 84
<212> DNA
10 <213> Arabidopsis thaliana

<400> 31
tcagcttcgg gactcgctt tctctatcca acaaaccgga ataaatggga caatcgatg
60
15 tcggcgatga taccagagat cgat
84

20 <210> 32
<211> 28
<212> PRT
<213> Arabidopsis thaliana

<400> 32
25 Ser Ala Ser Gly Leu Ala Leu Leu Tyr Pro Thr Asn Arg Asn Lys Trp
1 5 10 15
Asp Asn Arg Met Ser Ala Met Ile Pro Glu Ile Asp
20 25
30

<210> 33
<211> 2814
35 <212> DNA
<213> Arabidopsis thaliana

<400> 33
40 atgaatcgta tgacgtcaag ctttcttctc ctgacgttcg ccataatgtaa actgatcata
60
gccgtgggtc taaacgtggg ccccaagttag ctccctccgca tcggagccat agatgtcgac
120
ggccacttca ccgtccaccc ttccgactta gcctccgtct cctcagactt cggtatgctg
180
45 aagtccacctg aagagccatt ggccgtgctt catccatcat cggccgaaga cgtggcacga
240
ctcgtcagaaa cagcttacgg ttcagccacg gcgttccgg tctcagcccg aggcacggc
300
50 cattccataaa acggacaagg cgccggcgaaa aggaacggtg tggtggttga aatgaaccac
360
ggcgtaacccg ggacgccccaa gccactcgac cgaccggatg aatgtatgt ggtatgtatgg
420
480
55 ggtggagagt tatgggtcga tgtgttgaag aaaacgttgg agcatggctt agcaccaaaa
480
tcatggacgg attacttgc tctaaccgtt ggaggcacac tctccaatgc aggaatcagt
540
ggtaagctt ttcaccatgg tcctcaaatt agtaacgtcc ttgagctcga cggttgcact
600
660
60 ggtagtatt aaaacattca agttcatata ttttaatgc ttttgtctga agttaacta

ataacaagaa attgatacca aaaagttaggg aaaggagagg tcatgagatg ctcagaagaa
720
gagaacacaa ggctattcca tggagttctt ggtggattag gtcaatttg gatcatca
780
5 cgagcacgaa tctctctcga accagctccc caaagggtaa tattttttt atgactagct
840
atcaaaaatc cctggcgggt ccatacgttg taatctttt agttttact gttgatggta
900
ttttttatat attttggata ataaaaccct aaaatggtat attgtgatga caggtgagat
960
ggatacgggt attgtattcg agcttcaaag tgtttacgga ggaccaagag tacttaatct
1020
10 caatgcatttcaattaaag tttgattacg tggaaaggttt ttttgcatttgc gacgaaggac
1080
15 tcgtcaacaa ttggagatct tctttcttctt ctccacgtaa ccccgtaag atctcctctg
1140
tttagttccaa cggctctgtt ttgtattgcc ttgagatcac caagaactac cacgactccg
1200
actccgaaat cggtgatcag gtcactttca ttattcactt agaaaaaaagc gatattttca
1260
20 tttttttatat tcatgaaatat ctggaaaggat ttaacgctat gcgactattt ggaaatcatt
1320
atgaaaaaaat atttatgttta tatgattgaa agtggctc atagttttt ttttgcatttgc
1380
25 acttttattat aacttaaattt tggaaaggagga catgaagaag aagccagaga ggatctacag
1440
agatcttagct tttccacctg aacttaataa tgcacattta tataattatt ttttttttctt
1500
30 taaagtttag tttatcacta gcaattat catggttact aattaagttag tggacagggt
1560
catggaccac tcactcacca aataatgatt cctttttact cttaagttta attttaataa
1620
aaccaactct actggaaatct taacttattcc ttggttttgg taggcttttta tagcaacacg
1680
35 gtttttttaa ttttccattt ccagattttt tatattaaat gtcgattttt ttttttttttgc
1740
tttcaggaag ttgagattct gatgaagaaa ttgaatttca taccgacatc ggtctttaca
1800
40 acggatttac aatatgtgga ctttctcgac cgggtacaca aggccgaatt gaagctccgg
1860
tccaagaattt tatgggaggt tccacaccca tggctcaacc ttttcgtgcc aaaatcaaga
1920
atctctgact tcgataaagg cgtttcaag ggcattttgg gaaataaaac aagtggccct
1980
45 attcttatct accccatgaa caaagacaag taagtcttga cattaccatt gattactact
2040
tctaaatttc ttctcttagaa aaaagaataa aacgatgtttt gcattgcatttgcatttgc
2100
50 tacacttgcgt gggattaattt agtggtccaa gaaaaaaagt ttgtcaaat tgaaaaaaac
2160
tagacacgtg gtacatggga ttgtccgaaa aacgatgtcc acatgtgcatttgcatttgc
2220
aagattgaca acaacacttc gtcggctcgat atttctttt ttgttttgc accaaatccg
2280
55 atggccaga ttgggtttat ttgtttttaa gttccatggtaa ctcatggtgg gtgggtccca
2340
atcagattct cctagaccaa accgatctca acgaaccctc cgcacatcat tgattattac
2400
60 attaatataat atattgtcgt tgctgacgtg tcgtatggat atgttattgt cagatggac
2460

gagaggagct cagccgtgac gccggatgag gaagtttct atctggtggc tctattgaga
2520
tcagcttaa cggacggtga agagacacag aagctagagt atctgaaaga tcagaaccgt
2580
5 cggatcttgg agttctgtga acaagccaag atcaatgtga agcagtatct tcctcaccac
2640
gcaacacacagg aagagtgggt ggctcatttt ggggacaagt gggatcggtt cagaagctta
2700
10 aaggctgagt ttgatcccg acacatactc gctactggtc agagaatctt tcaaaaccca
2760
tcttgcgtt tgttcctcc gtcgtcgat tcttcgtcag cggcttcatg gtga
2814

15 <210> 34
<211> 1620
<212> DNA
<213> *Arabidopsis thaliana*

20 <400> 34
atgaatcgta tgacgtcaag ctttcttctc ctgacgttcg ccatatgtaa actgatcata
60
gccgtgggtc taaacgtggg ccccagttagtgc ctcctccgca tcggagccat agatgtcgac
120
25 gcccacttca ccgtccaccc ttccgactta gcctccgtct cctcagactt cggtatgctg
180
aagtccaccc aagagccatt ggccgtgctt catccatcat cggccgaaga cgtggcacga
240
30 ctcgtcagaa cagttacgg ttcagccacg gcgtttccgg tctcagcccg aggccacccg
300
cattccataa acggacaagc cggccgggg aggaacggtg tgggtggttga aatgaaccac
360
ggcgtaaccg ggacgccccaa gccactcgac cgaccggatg aaatgtatgt ggtatgtatgg
420
35 ggtggaggt tatgggtcga tgggttgaag aaaacgttgg agcatggctt agcacaaaaa
480
tcatggacgg attacttgc tctaaccgtt ggaggtacac tctccatgc aggaatcagt
540
40 ggtcaagctt ttccaccatgg tcctcaaatt agtaacgtcc ttgagctcga cggttaact
600
ggaaaggag aggtgatgag atgctcagaa gaagagaaca caaggctatt ccatggagtt
660
cttgggtggat taggtcaatt tgggatcatac actcgagcac gaatctctc cgaaccagct
720
45 ccccaaagggt tgagatggat acgggtattt tattcgagct tcaaagtgtt tacggaggac
780
caagagtaact taatctcaat gcatggtcaa taaaagtttgc attacgtggaa aggtttgtg
840
50 attgtggacg aaggactcgat caacaattgg agatcttctt tcttcctcc acgtaacccc
900
gtcaagatct cctctgttag ttccaaacggc tctgtttgtt attgccttgc gatcaccaag
960
aactaccacg actccgactc cggaaatcgat gatcagggaaat tggagattct gatgaagaaa
1020
55 ttgaatttca taccgacatc ggtcttaca acggatttac aatatgtggaa ctttctcgac
1080
cggttacaca aggccgaatt gaagctccgg tccaaaggat tatgggaggt tccacaccca
1140
60 tggctcaacc tcttcgtgcc aaaaatcaaga atctctgact tcgataaaagg cgttttcaag
1200

ggcattttgg gaaataaaac aagtggccct attcttatct accccatgaa caaagacaaa
1260
tgggacgaga ggagctcagc cgtgacgccc gatgaggaag ttttctatct ggtggctcta
1320
5 ttgagatcag ctttaacgga cggtaagag acacagaagc tagagtatct gaaagatcag
1380
aaccgtcggc tcttgagtt ctgtgaacaa gccaagatca atgtgaagca gtatcttcct
1440
10 caccacgcaa cacaggaaga gtgggtggct cattttgggg acaagtggga tcggttcaga
1500
actttaaagg ctgagttga tccgcgacac atactcgcta ctggtcagag aatcttcaa
1560
15 aacccatctt tgtctttgtt tcctccgtcg tcgtttctt cgtcagcggc ttcatggta
1620
20 <210> 35
<211> 539
<212> PRT
Arabidopsis thaliana

<400> 35
Met Asn Arg Met Thr Ser Ser Phe Leu Leu Leu Thr Phe Ala Ile Cys
1 5 10 15
25 Lys Leu Ile Ile Ala Val Gly Leu Asn Val Gly Pro Ser Glu Leu Leu
20 25 30
30 Arg Ile Gly Ala Ile Asp Val Asp Gly His Phe Thr Val His Pro Ser
35 40 45
Asp Leu Ala Ser Val Ser Ser Asp Phe Gly Met Leu Lys Ser Pro Glu
50 55 60
35 Glu Pro Leu Ala Val Leu His Pro Ser Ser Ala Glu Asp Val Ala Arg
65 70 75 80
Leu Val Arg Thr Ala Tyr Gly Ser Ala Thr Ala Phe Pro Val Ser Ala
85 90 95
40 Arg Gly His Gly His Ser Ile Asn Gly Gln Ala Ala Gly Arg Asn
100 105 110
45 Gly Val Val Val Glu Met Asn His Gly Val Thr Gly Thr Pro Lys Pro
115 120 125
Leu Val Arg Pro Asp Glu Met Tyr Val Asp Val Trp Gly Gly Glu Leu
130 135 140
50 Trp Val Asp Val Leu Lys Lys Thr Leu Glu His Gly Leu Ala Pro Lys
145 150 155 160
Ser Trp Thr Asp Tyr Leu Tyr Leu Thr Val Gly Gly Thr Leu Ser Asn
165 170 175
55 Ala Gly Ile Ser Gly Gln Ala Phe His His Gly Pro Gln Ile Ser Asn
180 185 190
60 Val Leu Glu Leu Asp Val Val Thr Gly Lys Gly Glu Val Met Arg Cys
195 200 205

Ser Glu Glu Glu Asn Thr Arg Leu Phe His Gly Val Leu Gly Gly Leu
210 215 220

5 Gly Gln Phe Gly Ile Ile Thr Arg Ala Arg Ile Ser Leu Glu Pro Ala
225 230 235 240

Pro Gln Arg Val Arg Trp Ile Arg Val Leu Tyr Ser Ser Phe Lys Val
245 250 255

10 Phe Thr Glu Asp Gln Glu Tyr Leu Ile Ser Met His Gly Gln Leu Lys
260 265 270

Phe Asp Tyr Val Glu Gly Phe Val Ile Val Asp Glu Gly Leu Val Asn
15 275 280 285

Asn Trp Arg Ser Ser Phe Phe Ser Pro Arg Asn Pro Val Lys Ile Ser
290 295 300

20 Ser Val Ser Ser Asn Gly Ser Val Leu Tyr Cys Leu Glu Ile Thr Lys
305 310 315 320

Asn Tyr His Asp Ser Asp Ser Glu Ile Val Asp Gln Glu Val Glu Ile
325 330 335

25 Leu Met Lys Lys Leu Asn Phe Ile Pro Thr Ser Val Phe Thr Thr Asp
340 345 350

Leu Gln Tyr Val Asp Phe Leu Asp Arg Val His Lys Ala Glu Leu Lys
30 355 360 365

Leu Arg Ser Lys Asn Leu Trp Glu Val Pro His Pro Trp Leu Asn Leu
370 375 380

35 Phe Val Pro Lys Ser Arg Ile Ser Asp Phe Asp Lys Gly Val Phe Lys
385 390 395 400

Gly Ile Leu Gly Asn Lys Thr Ser Gly Pro Ile Leu Ile Tyr Pro Met
405 410 415

40 Asn Lys Asp Lys Trp Asp Glu Arg Ser Ser Ala Val Thr Pro Asp Glu
420 425 430

Glu Val Phe Tyr Leu Val Ala Leu Leu Arg Ser Ala Leu Thr Asp Gly
45 435 440 445

Glu Glu Thr Gln Lys Leu Glu Tyr Leu Lys Asp Gln Asn Arg Arg Ile
450 455 460

50 Leu Glu Phe Cys Glu Gln Ala Lys Ile Asn Val Lys Gln Tyr Leu Pro
465 470 475 480

His His Ala Thr Gln Glu Glu Trp Val Ala His Phe Gly Asp Lys Trp
485 490 495

55 Asp Arg Phe Arg Ser Leu Lys Ala Glu Phe Asp Pro Arg His Ile Leu
500 505 510

60 Ala Thr Gly Gln Arg Ile Phe Gln Asn Pro Ser Leu Ser Leu Phe Pro
515 520 525

Pro Ser Ser Ser Ser Ser Ala Ala Ser Trp
530 535

5

<210> 36
<211> 842
<212> DNA
10 <213> *Arabidopsis thaliana*

<400> 36
aagcttaaat gacaatttac taccttgggt tggcatgtat ttagagcgga acaaatac
60
15 catacatcaa acgaggatat acagagaaaa ttcatggaag tatgaaattt agaggacaat
120
ttctttctg ggctacaacg gaccggccca ttcgctcatt tacccagagg tatcgagtt
180
gtggactttt gatgccgcta gagactattt gcatcggtt gaaaaaaaaatg tttacttcgt
240
20 tgtaacaat tttctgaatg caatattttc ttgtcatga atatttaaac ttgttattac
300
tttcttttag ctttaggtgtg gacaattatg gagtttactt caaacgagga agaatcttaa
360
25 acgctcggtt caggtctcga aaacaaacca actcacaatc ctgacttaat tgaggaaaac
420
aatgcaaaac cacatgcattt cttccatatt tctatcataa tcttataaga aaaaacacta
480
30 ctaagtgaaa tgattctgta tataatataac caatgccttt tgtttgcgtat tattttatgt
540
atatataact attgactttt gtcattatg gatagtgtct cgggctctt gcaaacatata
600
ttcaaaagaaaa agttaatgac tgtaattat taatctgaaat ctagaaacag aaccccgagg
660
35 taaaagaaaa agacagagca catgaagttt agtacttttataatataat atatcattct
720
ttcttattgc ttatctctaa agcaaaaact tccctaaacc ctaagccaa ggactcagat
780
40 cgatgcagaa ccaagaaggc ttgtttggta tttgagagcc aaatgcaaaag aaaaaaaactc
840
tt
842